CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 (original): A method for obtaining an anisotropic film comprising the steps of: providing a substrate,

depositing by means of Cascade Crystallization Process at least one conjugated aromatic crystalline layer onto said substrate,

wherein said conjugated aromatic crystalline layer is characterized by

a globally ordered crystalline structure with an intermolecular spacing of 3.4 ± 0.3 Å in the direction of one of optical axes, and

formed by rodlike supramolecules, which comprise at least one polycyclic organic compound with a conjugated π-system and ionogenic groups, and

applying an external action upon at least one deposited conjugated aromatic crystalline layer,

wherein said external action is characterized by duration, character and intensity which are selected so as to ensure partial removal of ionogenic groups from the conjugated aromatic crystalline layer while retaining the crystalline structure after termination of the external action.

2 (original): The method according to Claim 1, wherein the ionogenic groups are selected from the list comprising sulfonic group, COO-, PO4-, cation groups, and carboxy groups.

3 (original): The method according to Claim 1, wherein the external action is applied by local or complete heating of said conjugated aromatic crystalline layer up to a temperature of pyrolysis.

4 (original): The method according to Claim 1, wherein the external action is applied with use of microwave and/or laser radiation upon at least part of said conjugated aromatic crystalline layer, wherein the frequency of the radiation is in resonance with at least one absorption band of the organic compound.

5 (original): The method according to Claim 1, wherein the external action is carried out by a method of two-photon absorption of laser radiation, wherein the sum frequency of two photons of laser radiation is in resonance with at least one absorption band of the organic compound.

6 (original): The method according to Claim 1, wherein the external action is local and forms a topological pattern.

7 (original): The method according to Claim 6, wherein a part of at least one conjugated aromatic crystalline layer is not subjected to said external action and consequently comprises ionogenic groups, and wherein said part of the conjugated aromatic crystalline layer is further dissolved with use of the polar solvents.

8 (original): The method according to Claim 1, wherein immediately after the step of the formation of the conjugated aromatic crystalline layer, further comprise the steps of (i) applying a mask of a material insoluble in polar solvents onto said conjugated aromatic crystalline layer, (ii) removing a part of the conjugated aromatic crystalline layer not covered by the mask by dissolving in a polar solvent, (iii) removing the mask, and (iv) drying.

9 (original): The method according to Claim 1, wherein the substrate is made of a material whose temperature of destruction exceeds the temperature to which the substrate is heated in the course of said external action.

10 (original): The method according to Claim 1, wherein the substrate is made of one or several materials of the group comprising plastics, glasses, ceramics, metal-ceramic composites, and metals.

11 (original): The method according to Claim 1, wherein the substrate is made of a flexible material.

12 (original): The method according to Claim 1, wherein the substrate is made of a rigid material.

13 (original): The method according to Claim 1, wherein the surface of the substrate is flat, convex, concave, or any combination thereof.

14 (original): The method according to Claim 1, wherein at least a part of the substrate surface possesses anisotropic properties, which are caused by either chemical bonds, or relief or texture, which are formed on the substrate surface, and which are made of the substrate material, or of another material.

15 (original): The method according to Claim 1, wherein prior to the step of depositing the conjugated aromatic crystalline layer the method further comprises a step of forming at least one alignment layer on said substrate.

16 (original): The method according to Claim 15, wherein said alignment layer is deposited on the substrate by oblique deposition of a special material from a gas (vapor) phase.

17 (original): The method according to Claim 16, wherein said special material is silicon dioxide.

18 (original): The method according to Claim 15, wherein at least one alignment layer is made of a polymer material oriented by rubbing in a certain preset direction.

19 (original): The method according to Claim 15, wherein at least one alignment layer is made of a photosensitive polymeric material oriented by exposure to a polarized light.

20 (original): The method according to Claim 1, wherein prior to the step of depositing the conjugated aromatic crystalline layer the method further comprises a step of forming at least one polyion layer on said substrate.

21 (original): The method according to Claim 20, wherein the polyion layer is positively charged in the course of deposition from an aqueous solution onto the substrate.

22 (original): The method according to Claim 21, wherein the substrate is charged negatively in order to attract said polyion layer by means of electrostatic interaction.

23 (original): The method according to Claim 21, wherein said conjugated aromatic crystalline layer comprises negatively charged ionogenic groups at the periphery of molecules of organic compounds, whereby at least one of these groups is attracted to said polyion layer.

24 (original): The method according to Claim 21, wherein said polyion layer is made of any material selected from the group comprising poly (diallyldimethylammonium chloride), poly (ethyleneimine), and poly (allylamine hydrochloride).

25 (original): The method according to Claim 1, wherein prior to the formation of the conjugated aromatic crystalline layer the substrate is covered with an additional layer of a surfactant, which increases adhesion of the adjacent conjugated aromatic crystalline layer to the substrate or to another conjugated aromatic crystalline layer and does not hinder the formation of a liquid crystal phase in said conjugated aromatic crystalline layer.

26 (original): The method according to Claim 1, wherein the external action is applied in a buffer gas atmosphere.

27 (original): The method according to Claim 26, wherein the buffer gas is any gas selected from the list of inert or interactive gases comprising He, Ar, Xe, N_2, and CO_2.

28 (original): The method according to Claim 1, wherein the organic compound comprises at least one aromatic compound of the general structural formula:

$$\{K\}(M)n,$$

where K is a polycyclic organic compound with a conjugated π-system , which comprises one or more ionogenic groups, either like or unlike, ensuring the solubility in polar solvents for the formation of the lyotropic liquid crystal phase; M are modifying functional groups; and n is the number of functional groups.

29 (original): The method according to Claim 1, wherein the organic compound comprises at least one polycyclic organic aromatic conjugated compound or a derivative thereof capable of forming the lyotropic liquid crystal phase.

30 (original): The method according to Claim 1, wherein the organic compound is based on one material selected from the group comprising indanthrone (Vat Blue 4), 1,4,5,8-perylenetetracarboxylic acid dibenzoimidazole (Vat Red 14), 3,4,9,10- perylenetetracarboxylic acid dibenzoimidazole, quinacridone (Pigment Violet 19), 3,4,9,10-pyrylenetetracarboxylic

dianhydride (PTCDA), bis- (1,2,5-thiadiazolo)- p-quinobis-(1,3- dithiol) (BTQBT), and aluminum tris(8-hydroxyquinoline) (Alq3).

31 (original): The method according to Claim 1, wherein the organic compound is based on any phthalocyanine or their mixtures selected from the groups comprising metal-free phthalocyanine (H_2Pc), Li_2Pc, MgPc and phthalocyanines with monovalent or divalent metal; AlClPc, AlOHPc and phthalocyanines with metal halide or a metal hydroxide; TiOPc, $SiCl_2Pc$, $Si(OH)_2Pc$ and phthalocyanines with tetravalent metals; phthalocyanines in which the central ion of metal is replaced or a substitution is made on the sulfonic acid (or amide), carboxylic acid, alkyl, aryl, halide, nitro or other phthalocyanine ring; VOPc, CrPc, FePc, CoPc, NiPc, CuPc, ZnPc, $SnCl_2Pc$, PbPc, $Ge(OH)_2Pc$, and InBrPc.

32 (original): The method according to Claim 1, wherein the organic compound is based on one organic compound or their mixtures selected from the group comprising 3,3'-dichlorobenzidine, 2,7-diaminofluorenone, 2,6- diaminoanthraquinone, 2,7-diaminoanthraquinone, (p- aminophenyl)phenylamine, tris(p-aminophenyl)amine, 2,7-diaminodibenzothiophene sulfone, 2,7- diaminodibenzothiophene, 2-(p-aminophenyl)-6-aminobenzoxazole, bis(p-aminophenyl)amine, N- methylbis(p-aminophenyl)amine, 2,5-bis(p-aminophenyl)- 1,3,4-oxadiazole, 1,6-diaminopyrene, and 1,5- diaminonaphthalene.

33 (original): The method according to Claim 1, wherein the anisotropic film is formed by at least two sequentially formed conjugated aromatic crystalline layers, and wherein the duration, character, and intensity of the external action upon each conjugated aromatic crystalline layer are selected so as to ensure partial removal of ionogenic groups from at least a part of the conjugated aromatic crystalline layer while retaining the crystalline structure of this and preceding conjugated aromatic crystalline layer after termination of the external action.

34 (original): The method according to Claim 33, wherein the external action upon each conjugated aromatic crystalline layer is performed by local or complete heating of this conjugated aromatic crystalline layer to a temperature of pyrolysis and wherein the organic compounds of said conjugated aromatic crystalline layer being selected so that the temperature of pyrolysis for each next conjugated aromatic crystalline layer is lower than that of the preceding conjugated aromatic crystalline layer.

35 (original): The method according to Claim 33, further comprising an additional external thermal action applied to the anisotropic film, the duration, character, and intensity of which are sufficient for mutual intercalation of organic compounds in at least one pair of adjacent conjugated aromatic crystalline layers.

36 (original): The method according to Claim 34, further comprising and additional external thermal action applied to the anisotropic film, the duration, character, and intensity of which are sufficient for the mutual intercalation of organic compounds in at least one pair of adjacent conjugated aromatic crystalline layers.

37 (original): The method according to Claim 36, wherein the intercalation temperature is selected below the temperature of pyrolysis of a conjugated aromatic crystalline layer which is last subjected to the external action.

38 (original): The method according to Claim 33, further comprising a step of forming at least one polyion layer between said conjugated aromatic crystalline layers.

39 (original): The method according to Claim 38, wherein the polyion layers are oppositely charged with respect to the conjugated aromatic crystalline layers.

40 (original): The method according to Claim 38, further comprising a step of aligning at least one polyion layer in a certain preset direction prior to the formation of said conjugated aromatic crystalline layer.

41 (original): The method according to Claim 40, further comprising a step of aligning at least one of two conjugated aromatic crystalline layers in the same direction as the polyion layer.

42 (original): The method according to Claim 33, further comprising a step of aligning the conjugated aromatic crystalline layers in the opposite directions, wherein the alignment directions are opposite for each pair of subsequent conjugated aromatic crystalline layers.

43 (original): The method according to Claim 38, wherein the thickness of the polyion layer is approximately equal to the size of the polyion molecule.

Claims 44-54 (canceled).